

! FINDPATTERNS on ~~ADP~~\* allowing 0 mismatches

1 HADGSFSDENMT(M,L,I,V,C)LD(A,S,T,P,G,N,D,E,Q)LA(A,S,T,P,G)(H,R)DFINWL(M,L,I,V,

*use* → GCHY ck: 206 len: 180 | glucagon precursor - golden hamster

*1 accession* HADGSFSDENMT(M,L,I,V,C)LD(A,S,T,P,G,N,D,E,Q)LA(A,S,T,P,G)(H,R)DFIN

*ITD to match* HADGSFSDENMT(I)LD(S)LA(T)(R)DFINWL(I)(Q)TKITD - *guinea match*

*alignment* 146: ELGRR HADGSFSDENMTIIDLATRDPIINWLIQTKITD KK

*to dithion* *matching portion of dls seq*

GCPG ck: 106 len: 158 | glucagon precursor - pig (fragment)

1 HADGSFSDENMT(M,L,I,V,C)LD(A,S,T,P,G,N,D,E,Q)LA(A,S,T,P,G)(H,R)DFIN

126: ELGRR HADGSFSDENMTIIDLATRDPIINWLHHTKITD

GCGP ck: 629 len: 180 | glucagon precursor - guinea pig

1 HADGSFSDENMT(M,L,I,V,C)LD(A,S,T,P,G,N,D,E,Q)LA(A,S,T,P,G)(H,R)DFIN

146: ELGRR HADGSFSDENMTIIDLATRDPIINWLIQTKITD RK

GCHU ck: 9748 len: 180 | glucagon precursor [validated] - human

1 HADGSFSDENMT(M,L,I,V,C)LD(A,S,T,P,G,N,D,E,Q)LA(A,S,T,P,G)(H,R)DFIN

146: ELGRR HADGSFSDENMTIIDLATRDPIINWLIQTKITD RK

GCRT ck: 9106 len: 180 | glucagon precursor - rat

1 HADGSFSDENMT(M,L,I,V,C)LD(A,S,T,P,G,N,D,E,Q)LA(A,S,T,P,G)(H,R)DFIN

146: ELGRR HADGSFSDENMTIIDLATRDPIINWLIQTKITD KK

Databases searched:

PIR, Release 79.0, Released on 16Aug2004, Formatted on 7Oct2004

Total finds: 5

Total length: 96,216,763

Total sequences: 283,416

CPU time: 02:46.71

I:AA SEQUENCE 1.0  
 P1;GCHY - glucagon precursor - golden hamster  
 N/Contains: glucenin-related peptide; glucagon; glucagon-like peptide 1;  
 glucagon-like peptide 2  
 C/Species: Mesocricetus auratus (golden hamster)  
 C/Date: 13-Jun-1983 #sequence\_revision 13-Jun-1983 #text\_change 20-Mar-1998  
 C/Accession: A01539  
 R;Bell, G.T.; Santerre, R.F.; Mullenbach, G.T.  
 Nature 302, 716-718, 1983  
 A/Title: Hamster preproglucagon contains the sequence of glucagon and two  
 related peptides.  
 A/Reference number: A01539; MUID:83167563; PMID:6835407  
 A/Accession: A01539  
 A/Molecule type: mRNA  
 A/Residues: 1-180 <BEL>  
 A/Cross-references: EMBL:J00059  
 C/Superfamily: glucagon  
 C/Keywords: amidated carboxyl end; carbohydrate metabolism; duplication;  
 hormone; pancreas  
 F:1-20/Domain: signal sequence #status predicted <SIG>  
 F:21-180/Product: proglucagon #status predicted <PGC>  
 F:21-50/Region: glucenin-related peptide #status predicted  
 F:53-81/Product: glucagon #status predicted <GCN>  
 F:98-127/Product: glucagon-like peptide 1 #status predicted <GL1>  
 F:146-180/Product: glucagon-like peptide 2 #status predicted <GL2>  
 F:127/Modified site: amidated carboxyl end (Arg) (amide in mature form from  
 following glycine) #status predicted

GCHY Length: 180 December 27, 2004 13:06 Type: P Check: 206 ..

1 MNKIYVAGF FCGAGGSGWQ HSLQDTPEKS RSPRASQDP LEDPDQINED  
 51 KRHSQGTFTS DYSKYLDSSR AQDFVQWLMN TKRNNNIK RHDEFERHAE  
 101 GTFTSDVSSY LEGQAKEFI APLVKGRRR DPPEVTIVE ELGRRHADGS  
 151 FSDEMTITLD SLATRPFINW LIQTKITDKK

## !!AA\_SEQUENCE 1.0

P1:GCRG - glucagon precursor - pig (fragment)

N:Alternate names: glicentin; oxyntomodulin

N:Contains: glicentin-related peptide; glucagon; glucagon-37 (oxyntomodulin);

glucagon-69 (glicentin); glucagon-like peptide 1; glucagon-like peptide 2

C:Species: Sus scrofa domestica (domestic pig)

C:Date: 17-Dec-1982 #sequence revision 31-Mar-1993 #text\_change 20-Mar-1998

C:Accession: A01540; A60312; A91781; B32614; A28064

R:Thim, L.; Moody, A.V.

Regul. Pept. 2, 139-150, 1981

A:Title: The primary structure of porcine glicentin (proglucagon).

A:Reference number: A94233; PMID:81248172; PMID:6894800

A:Accession: A01540

A:Molecule type: protein

A:Residues: 1-69 &lt;TH1&gt;

R:Thim, L.; Moody, A.V.

Regul. Pept. Suppl. 2, S33, 1983

A:Title: Primary structure of a possible porcine proglucagon fragment.

A:Reference number: A60312

A:Molecule type: protein

A:Residues: 1-30 &lt;TH2&gt;

A:Note: this peptide is co-secreted with glucagon from the pancreas

R:Brumer, W.W.; Sinn, L.G.; Behrens, O.K.

J. Am. Chem. Soc. 79, 2807-2810, 1957

A:Title: The amino acid sequence of glucagon. V. Location of amide groups, acid

degradation studies and summary of sequential evidence.

A:Reference number: A91781

A:Accession: A91781

A:Molecule type: protein

A:Residues: 33-61 &lt;BRO&gt;

R:Orskov, C.; Berant, M.; Johnsen, A.H.; Hojrup, P.; Holst, J.J.

J. Biol. Chem. 264, 12826-12829, 1989

A:Title: Complete sequences of glucagon-like peptide-1 from human and pig small

intestine.

A:Reference number: A92732; PMID:89327238; PMID:2753890

A:Accession: B32614

A:Molecule type: protein

A:Residues: 78-107 &lt;ORS&gt;

R:Buhl, T.; Thim, L.; Kofod, H.; Orskov, C.; Harling, H.; Holst, J.J.

J. Biol. Chem. 263, 8621-8624, 1988

A:Title: Naturally occurring products of proglucagon 111-160 in the porcine and

human small intestine.

A:Reference number: A28064; PMID:88243712; PMID:3379036

A:Accession: A28064

A:Molecule type: protein

A:Residues: 111-158 &lt;BUH&gt;

C:Comment: X's represent missing amino acids, mostly basic, that are predicted

to exist in proglucagon before cleavage after basic residues.

C:Superfamily: glucagon

C:Keywords: amidated carboxyl end; carbohydrate metabolism; duplication;

hormone; intestine; pancreas

F:1-69/Product: glucagon-69 #status experimental &lt;G69&gt;

F:1-30/Region: glicentin-related peptide #status experimental

F:33-69/Product: glucagon-37 #status predicted &lt;G37&gt;

F:33-61/Product: glucagon #status experimental &lt;GCN&gt;

F:78-107/Product: glucagon-like peptide 1 #status experimental &lt;GL1&gt;

F:126-158/Product: glucagon-like peptide 2 #status experimental &lt;GL2&gt;

F:107/Modified site: amidated carboxyl end (Arg) (amide in mature form from

following glycine) #status experimental

GCRG Length: 158 December 27, 2004 13:06 Type: P Check: 106 ..

1 RSLQNTTEKS RSPAPQTD LDDPDQNTD KRHSQGTFS DYSKYLSRR

51 AODFVQWLMN TRNNKNIAK XXXXXXXXAE GFETSDVSSY LEGQAKEFI

101 AMLVKGRGX DPPEVTIVE ELGRHADGS FSDENMTVD NLATRDPIW

151 LHHTKITD

*use accession ID to match alignment to alignment*

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!!AA SEQUENCE 1.0
P1:GCGP-- glucagon precursor - guinea pig
N:Alternate names: oxyntomodulin
N:Contains: glucocorticoid-related peptide; glucagon; glucagon-37 (oxyntomodulin);
glucagon-like peptide 1; glucagon-like peptide 2
C:Species: Cavia porcellus (guinea pig)
C:Date: 30-Sep-1987 #sequence revision 31-Dec-1992 #text_change 09-Jul-2004
C:Accession: A24856; A23849; A60323
R:Seino, S.; Welsh, M.; Bell, G.I.; Chan, S.J.; Steiner, D.F.
FEBS Lett. 203, 25-30, 1986
A:Title: Mutations in the guinea pig preproglucagon gene are restricted to a
specific portion of the prohormone sequence.
A:Reference number: A24856; MUID:86248118; PMID:3755107
A:Accession: A24856
A:Molecule type: mRNA
A:Residues: 1-180 <SET>
A:Cross-references: UNIPROT:P05110; DDBJ:D00014; GB:N00014; NID:G220288;
PIDN:BAA00010.1; PID:G220289
R:Huang, C.G.; Eng, J.; Pan, Y.C.E.; Hulmes, J.D.; Yalow, R.S.
Diabetes 35, 508-512, 1986
A:Title: Guinea pig glucagon differs from other mammalian glucagons.
A:Reference number: A23849; MUID:86165412; PMID:3956884
A:Accession: A23849
A:Molecule type: protein
A:Residues: 53-81 <HUN>
R:Conlon, J.M.; Hansen, H.F.; Schwartz, T.W.
Regul. Pept. 11, 309-320, 1985
A:Title: Primary structure of glucagon and a partial sequence of oxyntomodulin
(glucagon-37) from the guinea pig.
A:Reference number: A60323; MUID:86017849; PMID:4048553
A:Accession: A60323
A:Molecule type: protein
A:Residues: 53-81 <CON>
A:Note: glucagon-37 was not completely sequenced
C:Superfamily: glucagon
C:Keywords: amidated carboxyl end; carbohydrate metabolism; duplication;
hormone; pancreas
F:1-20/Domain: signal sequence #status predicted <SIG>
F:21-180/Product: proglucagon #status predicted <PGC>
F:21-50/Region: glucocorticoid-related peptide #status predicted
F:53-89/Product: glucagon-37 (oxyntomodulin) #status experimental <G37>
F:53-81/Product: glucagon #status experimental <GCN>
F:98-127/Product: glucagon-like peptide 1 #status predicted <GL1>
F:146-178/Product: glucagon-like peptide 2 #status predicted <GL2>
F:127/Modified site: amidated carboxyl end (Arg) (amide in mature form from
following glycine) #status predicted

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GCgp Length: 180 December 27, 2004 13:06 Type: P Check: 629 ..

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1  MKSVYFVAGL FIMLAQSMQ RSLQDTTEKP RSVSASQTDV LDDPDQNNED
51  KRHSQGTFTS DYSKYLDSRR AQQFLKWLIN VKRNNNNIAK RHDEPERHAE
101 GFTSDVSSY LEGQAKEFI AMLVKGGRGRR DPPEEVAIVE ELGRHADGS
151 FSDENNTILD NLATRDPIWV LIQTKITDRK

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1:AA\_SEQUENCE 1.0  
 P1:GCHU - glucagon precursor [validated] - human  
 N:Contains: glucagon; glucicentin-related polypeptide (GRPP); glucagon; glucagon-like peptide 1 (GLP1); glucagon-like peptide 2 (GLP2); major proglucagon fragment; oxyntomodulin; truncated glucagon-like peptide 1 (tGLP1)  
 C:Species: Homo sapiens (man)  
 C:Date: 24-Apr-1984 #sequence revision 31-Mar-1993 #text change 09-Jul-2004  
 C:Accession: A24377; A4197; A30875; A2614; A01541; S23309  
 R:White, J.W.; Saunders, G.F.  
 Nucleic Acids Res. 14, 4719-4730, 1986  
 A:Title: Structure of the human glucagon gene.  
 A:Reference number: A24377; PMID:86259053; PMID:3725587  
 A:Accession: A24377  
 A:Molecule type: DNA  
 A:Residues: 1-180 <WHI>  
 A:Cross-references: UNIPROT:P01275; GB:X03991  
 R:Bell, G.I.; Sanchez-Pescador, R.; Laybourn, P.J.; Najarian, R.C.  
 Nature 304, 368-371, 1983  
 A:Title: Exon duplication and divergence in the human preproglucagon gene.  
 A:Reference number: A4197; PMID:83271477; PMID:6877358  
 A:Accession: A4197  
 A:Molecule type: DNA  
 A:Residues: 1-179 <BEL>  
 A:Cross-references: GB:V01515; NID:G31777; PIDN:CAA24759.1; PID:G31778  
 R:Drucker, D.J.; Aaa, S.  
 J. Biol. Chem. 263, 13475-13478, 1988  
 A:Title: Glucagon gene expression in vertebrate brain.  
 A:Reference number: A30875; PMID:88330860; PMID:2901414  
 A:Accession: A30875  
 A:Molecule type: mRNA  
 A:Residues: 1-180 <DRU>  
 A:Cross-references: GB:J04040; NID:G183269; PIDN:AAA52567.1; PID:G183270  
 R:Orskov, C.; Bersani, M.; Johnsen, A.H.; Højrup, P.; Holst, J.J.  
 J. Biol. Chem. 264, 12826-12829, 1989  
 A:Title: Complete sequences of glucagon-like peptide-1 from human and pig small intestine.  
 A:Reference number: A92732; MUID:89327238; PMID:2753890  
 A:Accession: A32614  
 A:Molecule type: protein  
 A:Residues: 98-127 <ORS>  
 R:Thomsen, J.; Kristiansen, K.; Brunfeldt, K.; Sundby, F.  
 FEBS Lett. 21, 315-319, 1972  
 A:Title: The amino acid sequence of human glucagon.  
 A:Reference number: A91373  
 A:Accession: A01541  
 A:Molecule type: protein  
 A:Residues: 53-81 <THO>  
 R:Taugita, A.; Takemoto, K.; Kamo, M.; Iwade, H.  
 Eur. J. Biochem. 206, 691-696, 1992  
 A:Title: C-terminal sequencing of protein. A novel partial acid hydrolysis and analysis by mass spectrometry.  
 A:Reference number: S23188; MUID:92288996; PMID:1606956  
 A:Accession: S23309  
 A:Molecule type: protein  
 A:Residues: 53-81 <TSU>  
 C:Comment: In pancreatic alpha-cells, proglucagon is processed to glucicentin-related polypeptide, glucagon, and major proglucagon fragment that is further processed to glucagon-like peptide 1. In intestinal L cells, proglucagon is processed to truncated glucagon-like peptide 1, glucagon-like peptide 2, and glucicentin that is partially further processed to glucicentin-related polypeptide and oxyntomodulin.  
 C:Genetics:  
 A:Gene: GDB:GCG  
 A:Cross-references: GDB:119265; OMIM:138030  
 A:Map position: 2q36-2q37  
 A:Introns: 31/2; 85/2; 131/2; 179/2  
 C:Superfamily: glucagon  
 C:Keywords: amidated carboxyl end; carbohydrate metabolism; duplication; hormone; intestine; pancreas  
 F:1-20/Domain: signal sequence #status predicted <SIG>  
 F:21-180/Product: proglucagon #status experimental <PGC>  
 F:21-89/Product: glucicentin #status experimental <GLN>  
 F:21-50/Product: glucicentin-related polypeptide #status predicted <GRPP>

F:53-89/Product: oxyntomodulin #status experimental <OXN>  
 F:53-81/Product: glucagon #status experimental <GCN>  
 F:92-178/Product: major proglucagon fragment #status experimental <GL1>  
 F:92-127/Product: glucagon-like peptide 1 #status experimental <GL1>  
 F:98-127/Product: truncated glucagon-like peptide 1 #status experimental <TGL>  
 F:146-178/Product: glucagon-like peptide 2 #status predicted <GL2>  
 F:127/Modified site: amidated carboxyl end (Arg) (amide in mature form from following glycine) #status experimental

GCHU length: 180 December 27, 2004 13:06 Type: P Check: 9748 ..

1 MKSIYFVAGL FVMEVQGSWQ RSLQDTEEKS RFSASQADP LSDPDQNMED  
 51 KRHSQGTFS DYSKYLDGSR AOPFVQWLMN TKRNRNLIK RHDEFERRAE  
 101 GTFTSDVSSY LEGAANEPI AMLVKGGR DPPEEVAIVE ELGRRHADGS  
 151 FSDENNTIID NLAARDFINW LIQTKINDRK

I:AA SEQUENCE 1.0  
 P1/GCRT - glucagon precursor - rat  
 N:Contains: glucentin-related peptide; glucagon; glucagon-like peptide 1;  
 glucagon-like peptide 2  
 C:Species: Rattus norvegicus (Norway rat)  
 C>Date: 30-Sep-1987 #sequence revision 30-Sep-1987 #text\_change 09-Jul-2004  
 C:Accession: A22655; A25190; A4198  
 R:Heinrich, G.; Gros, P.; Habener, J.F.  
 J. Biol. Chem. 259, 14082-14087, 1984  
 A>Title: Glucagon gene sequence: four of six exons encode separate functional  
 domains of rat pre-proglucagon.  
 A:Reference number: A22655; MUID:85054853; PMID:6094539  
 A:Accession: A22655  
 A:Molecule type: DNA  
 A:Residues: 1-180 <HEI>  
 A:Cross-references: UNIPROT:P06883; EMBL:K02809  
 A>Note: the authors translated the codon TTG for residue 10 as Glu and ACC for  
 residue 59 as Pro  
 R:Mojsos, S.; Heinrich, G.; Wilson, I.B.; Ravazzola, M.; Orci, L.; Habener, J.F.  
 J. Biol. Chem. 261, 11880-11889, 1986  
 A>Title: Preproglucagon gene expression in pancreas and intestine diversifies  
 at the level of post-translational processing.  
 A:Reference number: A25190; MUID:86304324; PMID:3528148  
 A:Accession: A25190  
 A>Status: not compared with conceptual translation  
 A:Molecule type: mRNA  
 A:Residues: 1-180 <MOJ>  
 R:Heinrich, G.; Gros, P.; Lund, P.K.; Bentley, R.C.; Habener, J.F.  
 Endocrinology 115, 2176-2181, 1984  
 A>Title: Pre-proglucagon messenger ribonucleic acid: nucleotide and encoded  
 amino acid sequences of the rat pancreatic complementary deoxyribonucleic acid.  
 A:Reference number: A44198; MUID:85051023; PMID:6548696  
 A:Accession: A44198  
 A>Status: preliminary  
 A:Molecule type: mRNA  
 A:Residues: 1-180 <HE2>  
 A:Cross-references: GB:K02809; GB:K02810; GB:K02811; GB:K02812  
 C:Genetics:  
 A:Introns: 31/2; 85/2; 131/2; 179/2  
 C:Superfamily: glucagon  
 C:Keywords: amidated carboxyl end; carbohydrate metabolism; duplication;  
 hormone; pancreas  
 F:1-20/Domain: signal sequence #status predicted <SIG>  
 F:21-180/Product: proglucagon #status predicted <PGC>  
 F:21-50/Region: glucentin-related peptide #status predicted  
 F:53-81/Product: glucagon #status predicted <GCN>  
 F:98-127/Product: glucagon-like peptide 1 #status predicted <GL1>  
 F:146-180/Product: glucagon-like peptide 2 #status predicted <GL2>  
 F:127/Modified site: amidated carboxyl end (Arg) (amide in mature form from  
 following glycine) #status predicted

GCRT Length: 180 December 27, 2004 13:07 Type: P Check: 9106 ..

1 MKTVIVAGL FVMLVQGSWQ HAPQDTEENA RSFPASQTEP LEDPDQINED  
 51 KRHSQGTTS DYSKYLDSSR AQDFVQWLMN TKRNNNIAK RHDEPRHAE  
 101 GTFTSDVSSY LEGQAKEFI AMLVKGRRR DPPEEVAIAE ELGRRHADGS  
 151 FSDEKNTILD NLATRDFINW LIQKITDKK